Outcome-Oriented Quality Assurance in an Ambulatory Setting

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Quality assurance has become an increasing concern to the government, health care plans, and organized medicine as managed care systems reduce absolute dollars spent on care. Most small group practices and individual physicians have little control over the various methods used to evaluate the quality of care. A computerized quality management approach improves quality assessment and directs local changes to improve patient care.

The Quality Assessment Program has been developed at the Waianae Coast Community Health Center (WCCHC) over the last 6 years. A federally qualified community health center, the quality assurance program is a computerized clinical information system linked to billing that supports a quality assessment program. It promotes provider involvement and measures outcomes of medical care. The system efficiently captures data related to hypertension and diabetes management, childhood growth, immunizations, health maintenance activities, and practice patterns. When fully developed with links to laboratory and prescription information, the quality assessment program is capable of displaying a wide range of provider behaviors, clinical information, and short-term outcomes, such as diabetes and hypertension control.

Major changes in diabetes management have been effected by the quality assessment program. The data and analyses from the clinical information system are presented to the providers in several formats. Education focused on improvement in clinical performance supports positive change to be captured in subsequent data analysis. The locally developed billing and clinical information system has improved care and provides the clinic staff with timely feedback on performance.

A practice-based quality assurance program measuring selective short-term outcomes is both feasible and effective in improving medical care. The system design allows for the integration of information into larger data sets complementing regional and national efforts at profiling practice patterns.

Assessing and improving quality of care is an integral part of the health care reform. Quality assessment, being mandated by health plans and federal regulations, is viewed by most physicians as an intrusion into the daily practice of medicine. Critical reviews of quality assurance programs have recommended discontinuation of the use of individual chart review and the Peer Review Organization.[1-4] Current trends focus on monitoring outcomes, establishing guidelines and developing provider profiles.[5-8] Outcome measurements relate to long-term morbidity or mortality data, and compare regional or institutional variations using large data sets.[9-10] Except for a limited number of focused studies mostly in academic centers, there is no description of computerized practice-based effort at assessing quality in the ambulatory setting.[11-12]

The implementation of a locally owned quality assessment program is imperative to maximally improve care.[13] The WCCHC computer-based system measures individual and practice-wide parameters of care. The successful collaborative efforts of the providers, administration, and systems developers have resulted in a sophisticated data collection system that is the basis of the quality assessment (QA) program. The information generated has led to major changes in diabetes management and continued improvement in a number of other clinical areas.

Methodology

The WCCHC serves approximately half of the 46,000 people in an economically disadvantaged community. Services include primary care, dental care, selected outpatient specialty care, community outreach programs, and a free-standing emergency care center. By ethnicity, the Waianae community is over 50% Native Hawaiian or part Hawaiian with the rest of the population from a mixed ethnic background. The Native Hawaiians, the indigenous people of the Hawaiian Islands, suffer from disproportionately high rates of type II diabetes, cardiovascular disease, certain cancers, and infant mortality.[14]

In 1986, a review of records showed a high percentage of diabetic patients who had failed to complete their nutritional counseling, and a team approach to diabetes management was organized. A nutritionist, a nurse, and a physician co-managed the patients on one morning each week from the physician's office. To measure the impact of this program, a computerized tracking system was developed to record demographic information, weights, blood glucose, frequency of visits, and hospitalizations.

In 1988, the Hawaii State Diabetes Control Program (HSDCP) initiated complication-screening clinics for patients with diabetes at the WCCHC. The HSDCP, targeting areas of high risk populations, accumulated information regarding risk factors and an abbreviated medical history while screening patients for complications. The information obtained from the HSDCP added to WCCHC knowledge of the diabetic population.

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Initial Data Analysis

Selected results of the computer-generated outcome measures provide examples of the types of information used in the QA program to direct program development and influence the providers' approach to patient management. Results are presented in chronological order followed by program development response.

Over the first 4 years of tracking, approximately one-third of the patients with diabetes failed to receive care at WCCHC in the following years (Table 1). These patients typically sought care for acute illnesses or acute complications of diabetes and had lapses from one to several years between physician contacts. Fifteen patients in the 1990 population were hospitalized; only one pregnant patient for diabetes control. In half, the principle diagnoses for admission were not related to diabetes (ie, a suicide attempt, pneumonia, COPD, etc). Diabetes-related complications, ischemic heart disease, and lower extremity infection accounted for the other 7 admissions. The 5 deaths over this 2-year period occurred in patients under the age of 60, all of whom were smokers; all died from underlying cardiac disease, and 60% had evidence of alcoholic cardiomyopathy. Outcome tracking of patients with gestational diabetes managed through a team approach showed rewarding results for the 18 months analyzed.[15]

The HSDCP profiled the Waianae diabetic population based on the screening of 107 patients. The most common self-reported problems in these patients were arthritis (50%) and lower back pain (43%). Significant other problems included asthma (21%), COPD (19%), and depression (17%). Sixteen percent of the population reported heart disease, 48% were hypertensive, and 28% currently were smokers.

Program Development—1988 to 1991

From 1988 to 1991, there was significant growth of the WCCHC diabetes program. Patients attending the diabetes clinic formed a diabetes support group that met weekly. Small grants funded a worksite wellness project involving screening and employer/employee education, and a local diabetes newsletter for patients was developed. The HSDCP held quarterly clinics screening for hypertension, dental disease, ophthalmopathy, and foot problems. Diabetes management was integrated into and supported other developing programs such as the *Malama Ola*, providing nutritional counseling to high-risk patients, and also the Waianae Diet Program, a culturally sensitive approach promoting traditional foods.[16-17]

Current Program Development

In 1991, two major events changed the QA program and the diabetes management program. WCCHC introduced its own computerized billing software permitting the tracking of all patients with diabetes or hypertension. WCCHC has added files for health maintenance and immunizations and has the capacity to monitor individual patient problem lists and prenatal care including pregnancy outcomes. WCCHC will introduce laboratory results and prescription drug files in the near future.[18]

WCCHC received a grant from the Office of Minority Health to develop the Diabetes Intervention Project, a community-based diabetes management program targeting noncompliant patients. Funding to a large part depended on needs documented by a computerized tracking system and has lead to major improvements in the management of patients with diabetes.

Recent Data Analysis

Data became available in 1991 permitting analysis of the 45,000 patients captured in the system since 1989. The expanded information allowed evaluation of a broader range of quality issues. For example, the indications for long-term anticoagulation increased to include most patients with chronic atrial fibrillation.[19] WCCHC analyzed the frequency of ordering pro-times recognizing the substantial risk to patients who are not adequately followed while they are on oral anticoagulation. Of the 49 patients on oral anticoagulation, 76% received follow-up pro-times in 30 days or less with 16% having tests done at greater than 45-day intervals. The Center began monitoring the providers' performance flu shots in 1993. Immunization rates varied from 25% to 40% among physicians with a clinic-wide average of 34%.

In 1993, a study of blood pressure control in our patient population who had diabetes found that 39% of the 469 patients with diabetes had an average blood pressure (over the last 3 encounters) greater than 140/90. In comparison, in the Diabetes Intervention Project, only 25% of the 69 patients had poorly controlled hypertension. A more complete breakdown of this data is presented elsewhere.[20] Longitudinal tracking of the first 21 patients in the Diabetes Intervention Project showed 5 had lost 10 pounds or more after one year.

Software Development

Medical information systems managing health plan data assess practice patterns as a means to indirectly measure quality.[20] To supplement practice profiles generated by third-party payers, WCCHC's QA program has substantially more information about provider performance than can be obtained from systems using claims data. The QA program has stressed provider involvement and acceptance by locally developed software rather than attempting to introduce a completely automated medical record.[21-22] Designed primarily for the WCCHC, the software can be modified easily to meet future regional and national data sets standards.[23] The WCCHC computer system has several objectives that promote efficiency and clinic wide acceptance. Computer skills are not required of all of the providers or staff. The system provides incentives for staff to improve their computer skills, but the system does not rely on these skills to function effectively. Clinical data is to be collected with the least amount of effort on the part of the provider. The structure of the program allows a substantial amount of the information to be collected passively from the billing record. Active collection of data such as the vital signs are captured on the billing encounter form at the time the vitals are taken. Data collection has to be accurate and complete. The insurance claims generated lacked accuracy to allow for the most effective practice profiling.[24] Flags in the computer system check entries to assure that they are in reasonable range, and reject claims with specific diagnoses, such as diabetes and hypertension, unless the required clinical data is collected. Timely and meaningful feedback is given to providers. On-line reminders of preventive services and other clinical alerts are used to improve quality.[25] Diseases or procedures that are relatively common are evaluated with practice patterns using the most recent available data. Finally, the QA system needs to be effective and efficient.[26] The QA program is capable of evaluating the QA process to assure cost-effectiveness.

Discussion

Physicians have always been responsible for providing the best possible care to patients, and now more than ever are held accountable for the cost and quality of medical care. The development of techniques to monitor outcomes assessment and standardization of care are now national priorities in the effort to provide affordable quality care and establish accountability.[27] Practice-based quality management must parallel these national efforts. The efforts at WCCHC to improve patient care are based on three principles.

The patient ultimately determines the quality of care; measures should reflect the effect of treatment based on patient parameters and outcomes. Practice profiles analyzing short-term patient outcomes are more than a provider profile and recognize the complexities in medical practice that extend beyond the walls of an office. Substandard quality of care as measured by the WCCHC approach may identify poor performance by a provider, the WCCHC health care system, or a patient.

Outcomes assessments should provide enough detail to guide physicians in making positive changes in the delivery of care.[28] The WCCHC efforts at developing an alternative approach to existing QA models is based on the principle that providers will improve the quality of care given reliable and useful information on his or her strengths and weaknesses. The primary incentive for change is improving the quality of life for the patient,[29] with financial, educational, and administrative incentives introduced when other feedback efforts fail.

Information does not have to be statistically significant to be clinically relevant. The outcome of an individual patient is not determined by statistical probability.[30] The system enhances the knowledge gained through practice by better organizing personal practice experience over time. For example, having 5 out of 21 patients accomplish greater than 10-pound weight losses over a year does not meet statistical significance, but for those 5 patients, these changes may influence individual long-term outcomes. In the 20% of patients with good diabetes control, the provider can ask what factors have prompted positive behavioral changes without requiring statistical validity in the conclusions.

Outcomes usually refer to the epidemiological studies of major health events such as death, complications or major procedures. Measuring therapeutic effects of treatment such as diabetes control and blood pressure control are referred to as short and intermediated outcomes of care and differ from measures established by practice guidelines or the more common measures of large outcome studies (Table 1). The distinction is important as the measurement of the quality of care by these different tools will likely come to very different conclusions.[31] The recent Diabetes Complication and Control Trial results,[32] showed that diabetes control reduces the progression of microvascular diabetes complications in insulin-dependent diabetes. Based on current knowledge, the control of blood pressure and blood sugar would logically influence the long-term outcome of patients with diabetes and would be a much better predictor than those measures captured in a process.

Continuous feedback on the quality of care changes both the provider's behavior and approaches to health care delivery. For most patients continuity of care needs to be established to improve diabetes control and reduce complications.[33] Knowing that many patients fail to get regular follow-up encourages providers to involve patients in their own care early and actively discussing the importance of follow-up care. In an ethnically mixed population, care plans have to be individualized. Intense health education or frequent return visits may result in the patient's noncompliance. Continuity of care, in part, is built on addressing patient concerns. A patient with chronic arthritis and diabetes may seek relief from the former while the physician focuses on the later. The diabetic population study (1990, n=69) had 5 premature deaths, all in smokers, and the rate of smoking is high particularly in the younger age group. Regular and effective counseling regarding smoking is supported by the timely feedback on the rate of cigarette usage. Follow-up reports results of altered practice styles.

Improved ability to measure the impact of care has directed resource allocation at WCCHC. The justification, direction and prioritization in program development for patients with diabetes at the WCCHC is based on the systematic analysis of patient care. Documenting a greater than 50% no-show rate to nutrition counseling in 1986 prompted a team approach to diabetes management. The limited profile based on a single provider's practice lead to the tracking of all patients with hypertension and diabetes. Providers have recently requested the addition of head circumference to the existing height and weight measurements to track pediatric growth and development. With obesity in the female diabetic population greater than 90%, the nutrition department developed the *Malama Ola* program and the Waianae Diet Program. Outcome data from the Waianae Diet Program shows remarkable improvement in blood glucose control.[13] WCCHC also supports a free smoking-cessation program.

The Diabetes Intervention Project targets the high-risk, noncompliant diabetic population. This program provides integration of a community-based diabetes program with a network of groups on the advisory board, diabetes management by community health workers supported by the diabetes team, continuation of the complication screening activities without direct HSDCP support, and the development of a number of community outreach projects.

The existing tracking system enhanced with lab values regarding lipids and Hemoglobin A-1-C will be used to evaluate the medical impact of this program, and provides data to seek third-party reimbursement for these services after the completion of the demonstration project.

The QA program has used several methods of packaging and delivering information to providers seeking the most effective approach. Feedback to providers must be meaningful, timely and presented in a positive manner.[34-35] Examples of these methods include: 1. Deficiencies in immunizations and preventive health exams are now listed on the provider's appointment schedules. 2. The results of the flu immunization ranking was shared with individual providers through a memo, and future analysis will compare year-to-year performance as well as the results compared to other providers. 3. Provider meetings were initially used to present the experience with diabetes management and discusses alternative approaches to care. 4. Sensitive issues such as poor performance on hypertension control in the diabetes population is presented to the provider group and not initially broken down to individual performance. 5. WCCHC has an in-house *Journal* written by the providers to review recent advances in medicine. The review of pro-time use was presented in this *Journal* coupled with a discussion of recent articles on anticoagulation in patients with atrial fibrillation.

Managed care and health care reform demand a much greater accountability regarding quality and challenge the existing tools to measure quality.[1,36-37] The quest for an improved QA system has lead health plans and the federal government to place more emphasis on outcomes studies, guidelines, patient satisfaction, and provider profiling. The major key in quality management is at the local level. The determinate of individual outcome hinges on the positive interaction of the patient and the local providers of care. The WCCHC has evolved a QA system designed to capture patient's short-term outcome data that has lead to modifying provider behavior and major changes in the health care delivery. The intentions are to have the clinical information system of WCCHC complement and integrate with the provider profiling of the major health plans who have more complete data on patient costs and long-term outcome. Data collection specifically intended to be used for quality measures expands the breath of information and enhances the accuracy over claims data or other system-wide uniform data tools similar to data used for research.[29] The QA program at WCCHC promises to improve quality through the sweeping changes occurring in health care today.

Table 1.—Process versus Outcomes

Process/Guidelines*	Outcomes
Steps of Physical Exam: Blood pressure, Thyroid, Cardiac, Pulses, Skin,	Short Term: Weight control Blood glucose control neuro
Laboratory: FBS,HbA1C, Lipid profile, UA, Thyroid functions	Intermediate term: Hospitalization Secondary complications Progression of complications
Eye Exam	
EKG	Long-term: Mortality
	Others:
Management Plan- Health Care Team used.	Risk factor reduction

*ADA,Diabetes Care 1989:12:365-68

Table 2.—Weight and Blood Glucose Control

	Patients With Diabetes		
	Average BldGlu (range)	Average Wt (range)	Average Age (range)
1989 Patients n=51	209 (114-511)	199 (103-332)	51 (20-82)
1990 Patients n=68	205 (45-387)	195 (89-313)	48 (18-79)
1989 Patients Lost to Follow-up n=17	245 (133-511)	202 (131-293)	46 (20-82)
1990 New Patients n=30	202 (45-354)	198 (89-313)	42 (18-79)

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